Midwest Defense Forum: DoD Insights and Supplier Matchmaking

April 14, 2021

Midwest Defense Forum: DoD Insights and Supplier Matchmaking

Agenda

9:00 - 9:20 am	**Opening Remarks**	**Rob Ivester, NIST MEP**
9:20 - 9:30 am	**MxD and MEP Collaboration**	**Chandra Brown, CEO, MxD**
9:30 - 10:15 am	**Practical Application of Digital Manufacturing**	**Tony Del Sesto, Technical Fellow, MxD**
10:15 - 10:45 am	**Small Business Panel Discussion: The Digital Journey**	**Moderator: Carroll Thomas, MxD Board Member and Former Director, NIST/MEP**
	Kansas: Shaun Huibsch, President, Metal Arts Machine Co., LLC	
	Colorado: Andrew Coors, CEO, Steelhead Composites	
10:45 - 11:00 am	**Break**	
11:00 - 11:45 am	**Panel Discussion: DoD Contracting Considerations**	**Moderator: Mike Yucuis, Government Engagement Manager, MxD**
	Paula Trimble, Policy Chief and Director of Small Business Programs , SDA	
	Dr. Ruby Crenshaw-Lawrence, Associate Director for Congressional and Legislative Small Business Policy	
11:45 - 12:00 pm	**Matchmaking**	**Katie Bilek, Co-Founder, govmates**

Rob Ivester

Acting MEP Director and Deputy Director

NIST Manufacturing Extension Partnership (MEP)

Opening Remarks

2021
MEP National Network Overview

MEP • MANUFACTURING
EXTENSION PARTNERSHIP®

https://www.nist.gov/mep/mep-national-network

NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

MEP National Network™

A unique public-private partnership that delivers comprehensive, proven solutions to U.S. manufacturers, fueling growth and advancing U.S. manufacturing.

Our mission is to strengthen and empower U.S. manufacturers.

2021 National Defense Authorization Act

SEC. 9415. COORDINATION WITH HOLLINGS MANUFACTURING EXTENSION PARTNERSHIP CENTERS.

"… each Manufacturing USA Institute […] shall, as appropriate, contract with a Hollings Manufacturing Extension Partnership Center in each State […] to provide defense industrial base-related outreach, technical assistance, workforce development, and technology transfer assistance to small and medium-sized manufacturers."

MEP National Network
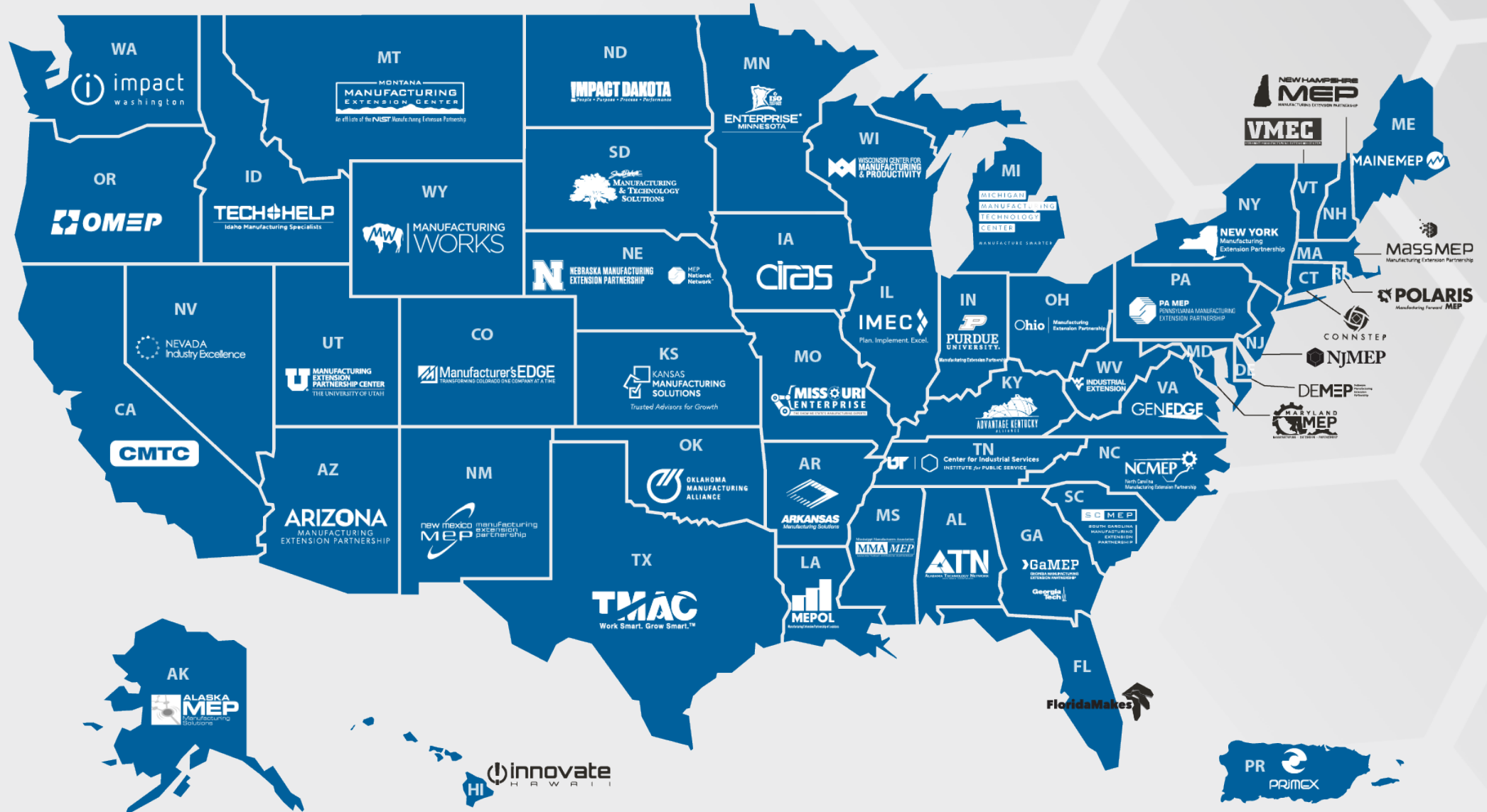
MEP National Network

Centers located in all   50 states and Puerto Rico.

Public-private partnership with local flexibility.

Federal funds, state investments, and private sector fees cover services.

Market driven program that creates high value for manufacturers.

Leverage partners to maximize service offerings.

Transfer technology and expertise to manufacturers.

Our Partners

Economic development organizations

Federal agencies & laboratories

Industry leaders & think tanks

Manufacturing USA Institutes

State & local government

Universities, community colleges & technical schools

Trade associations & other partners

Business Solution Examples

Supplier Scouting

Connects the capabilities, capacities, and business interests of U.S. manufacturers with the needs and business opportunities of various manufacturing supply chains.

Defense & Aerospace	Home Retail	Construction	Rail Equipment & Infrastructure	Transportation Infrastructure

https://www.nist.gov/mep/executive-order-14005

Manufacturing Day
Effects on Perception*

89% More aware of mfg jobs in their communities

84% More convinced that mfg provides careers that are interesting and rewarding

64% More motivated to pursue mfg careers

71% More likely to tell friends, family, parents or colleagues about mfg after attending an event

October 7, 2021

*Students who attended MFG Day events in 2016 were asked to participate in a survey administered by Deloitte

MANUFACTURING Institute

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Visit Our Blog

www.nist.gov/blogs/manufacturing-innovation-blog

Visit Our Website

www.nist.gov/mep

Contact Us:

mfg@nist.gov

301-975-5020
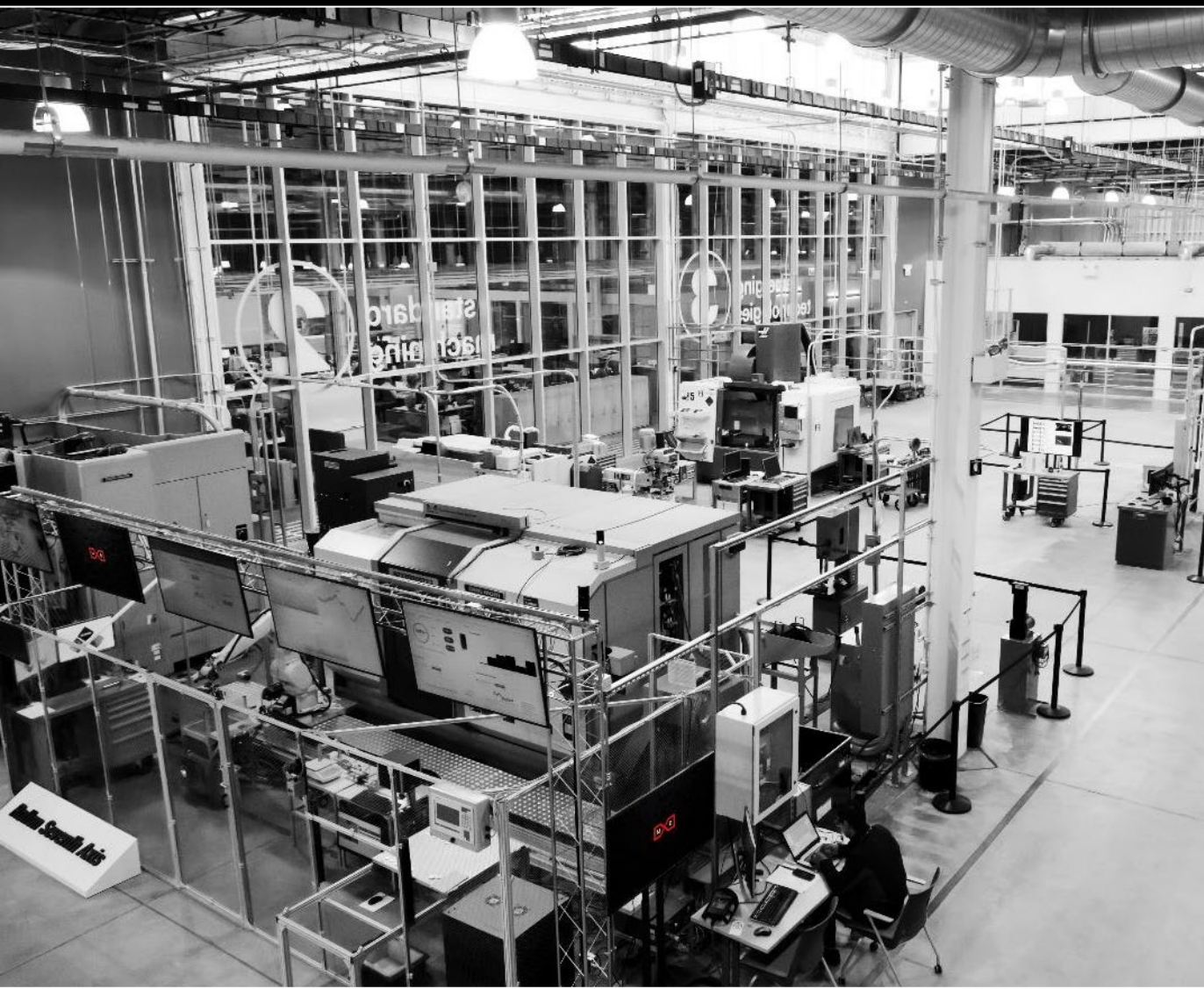
Chandra Brown
CEO
MxD

MxD and MEP Collaboration

A QUICK LOOK AT MxD

The Digital Manufacturing Institute

ℹ QUICK FACTS

- Launched **February 2014** with initial **$70M** in **DoD** funding

- **300+ members**, anchored by DoD and global manufacturing and technology leaders

- **75k ft² Innovation Center**, including 22k ft² manufacturing floor featuring **MxD's Future Factory**

- In 2019 designated the **National Center for Cybersecurity in Manufacturing** with **$14M** awarded to support securing America's supply chain

- In 2020 awarded $15M in CARES Act funding to support supply chain resiliency, medical device deployment, and pharmaceutical industry production

- Over **11,000** visitors annually

MxD HELPS SMALL MANUFACTURERS MAKE SENSE OF THE DIGITAL NOISE

MxD brings critical information and tools to small and mid-sized businesses

PROGRAMMING

Small businesses can participate in curated workshops and conferences that bring together innovation-driven companies to solve problems
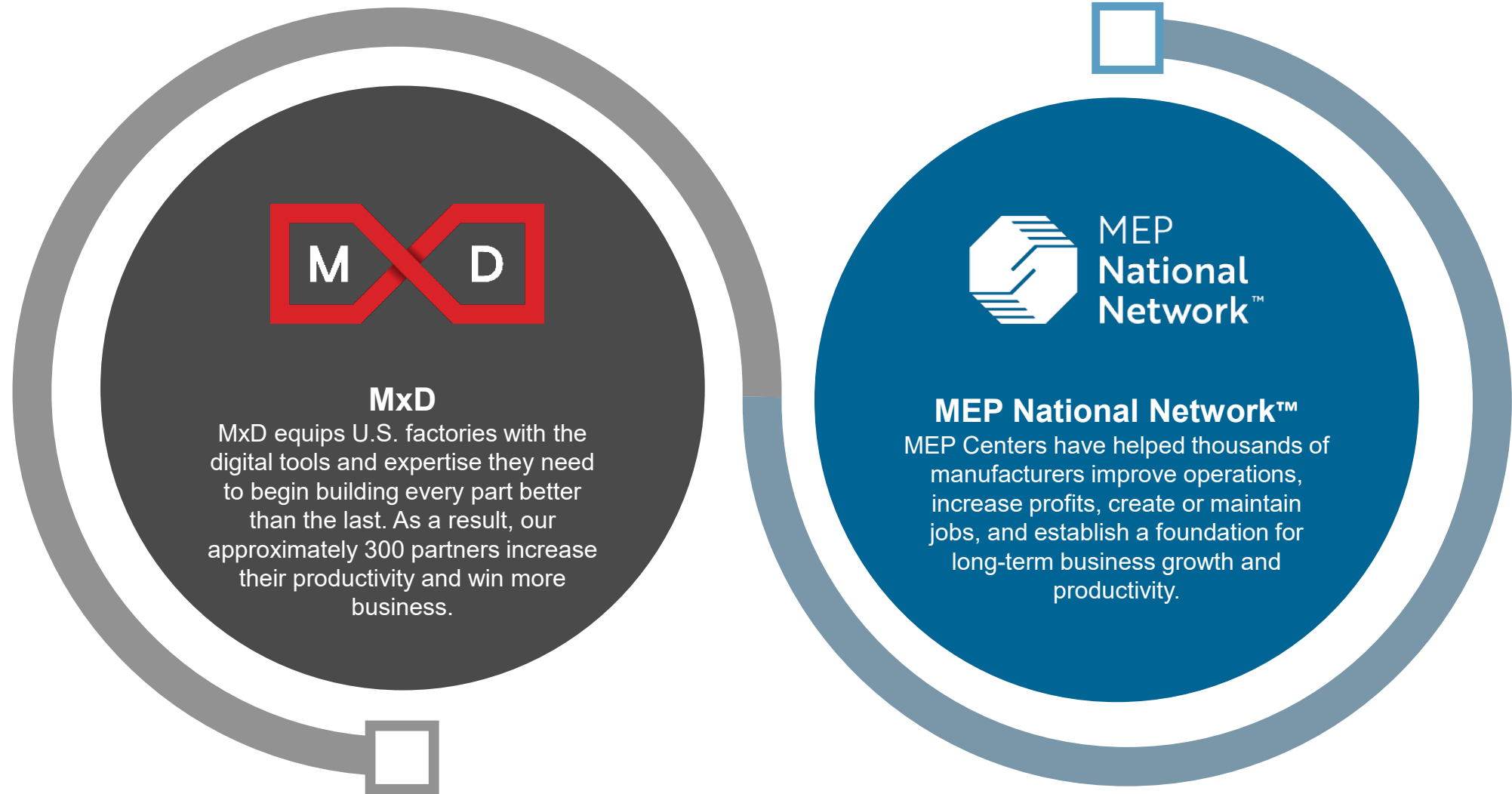
PROJECTS

Collaborative RD&D focused on tangible business impact for small businesses

PROVING ROI

MxD helps small businesses understand the impact of digital manufacturing and cybersecurity and identify the business case for investment

MxD and MEP National Network™ work together to reach small and mid-sized manufacturers

MxD
MxD equips U.S. factories with the digital tools and expertise they need to begin building every part better than the last. As a result, our approximately 300 partners increase their productivity and win more business.

MEP National Network™
MEP Centers have helped thousands of manufacturers improve operations, increase profits, create or maintain jobs, and establish a foundation for long-term business growth and productivity.

MxD

where innovative manufacturers go to forge their future

Chandra Brown
CEO
MxD

www.mxdusa.org

@MxDInnovates

Tony Del Sesto
Technical Fellow
MxD

The Practical Application of Digital Manufacturing

PRATICAL INDUSTRY 4.0

Tony Del Sesto

Technical Fellow, MxD

April 2021

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INTRODUCTION

TONY DEL SESTO

Hands-on, in-factory experience
More than 100 factories in 15 countries

Technical Fellow - MxD
Lead technical consultant to MxD membership and MxD project teams.
Demystify digital technologies into pragmatic manufacturing applications.
Report to the CTO

Vice President, Projects and Engineering- MxD
Drive projects which develop, demonstrate, educate, and deploy Industry 4.0
and cybersecurity technologies for advancement of American manufacturing
Reported to the CEO

Senior Director, Supply Chain –
Motorola Mobility (Lenovo)
Advanced technology manufacturing and global tooling leadership
Reported to the CQO

Senior Director, Global Procurement –
Motorola Mobility (Google)
Mechanical and electro-mechanical corporate procurement leadership.
$1 billion in annual spend management.
Reported to the CPO

Director, Motorola Singapore Design Centre –
Motorola Mobility LLC
Concept to customer product development leadership.
Dotted line report to the Motorola country president.

"Chrome don't get you home!"

Today's Approach to Discussion

- ☐ **Pragmatic viewpoint**

- ☐ **Commercially available technology**

- ☐ **What you can do now**

DIGITAL MANUFACTURING METHODOLOGY

A QUICK HISTORY LESSON

4.0 4th revolution
Cyber physical systems

3.0 3rd revolution
Electronic and IT systems, automation

2.0 2nd revolution
Mass production and electricity

1.0 1st revolution
Mechanization, steam and water power
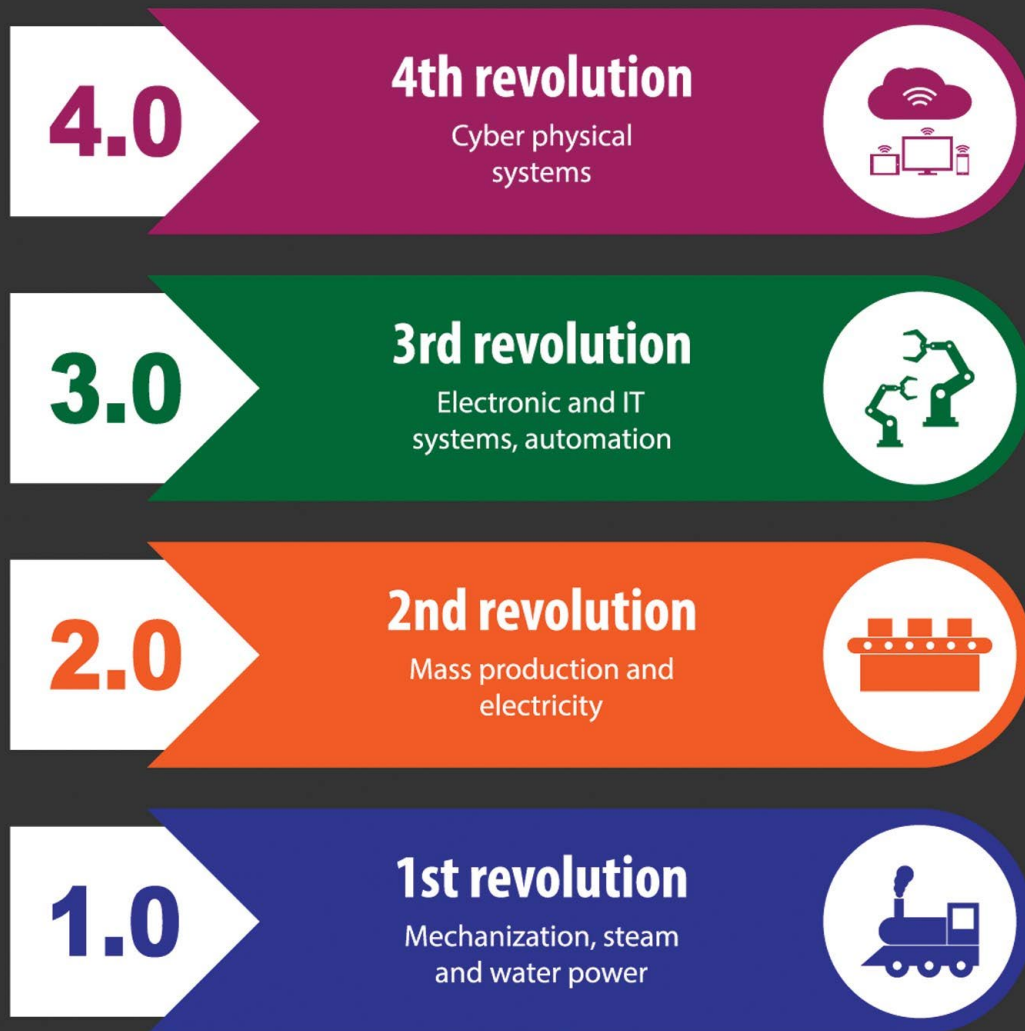
- Source: Britannica

The phrase *Fourth Industrial Revolution* was first introduced by a team of scientists developing a high-tech strategy for the German government in 2011.

The term was popularized in a 2015 article in *Foreign Affairs magazine*, authored by World Economic Forum executive chairman, Klaus Schwab.

- Source: Wikipedia

THE RATE OF CHANGE IS EXPONENTIAL

WHAT IS INDUSTRY 4.0?

☐ **A Google search of Industry 4.0 yields > 500,000,000 hits**

☐ **Ask 20 people what is Industry 4.0 and you get 20 different answers (and all of them might be right! ... or wrong!)**

☐ **A lot of information written about Industry 4.0 was written by people who have never worked in a commercial factory**

INDUSTRY 4.0

THE DIGITAL LANDSCAPE

☐ **The Vast Majority of Manufacturers Are Small Companies**

- 98% of U.S. manufacturers have fewer than 500 employees
- 73% of U.S. manufacturers have fewer than 20 employees (www.nam.org)

☐ **The 80/20 Rule at Major Companies**

- Many large companies only manufacture about 20% of the components in their projects
- You do not need to go too many levels in the supply chain to find a small business. See above!

☐ **There Are No Universal Standards for Digital Manufacturing**

- There is a plethora of enterprise systems
- Constantly evolving protocols with little interoperability
- Continued wide use of vendor proprietary interface schemes

☐ **The Rate of Adoption of Digital Is Wide-Ranging**

- Varies by industry
- Varies by region
- Varies by size of company

Generally Accepted Definition(s)

- ☐ "the intelligent networking of machines and processes for industry with the help of information and communication technology" - Plattform Industrie 4.0

- ☐ "the ongoing automation of traditional manufacturing and industrial practices, using modern smart technology" - Wikipedia

- ☐ "the advent of 'cyber-physical systems' involving entirely new capabilities for people and machines" – The World Economic Forum

IS THIS HELPFUL FOR THE AVERAGE MANUFACTURER?
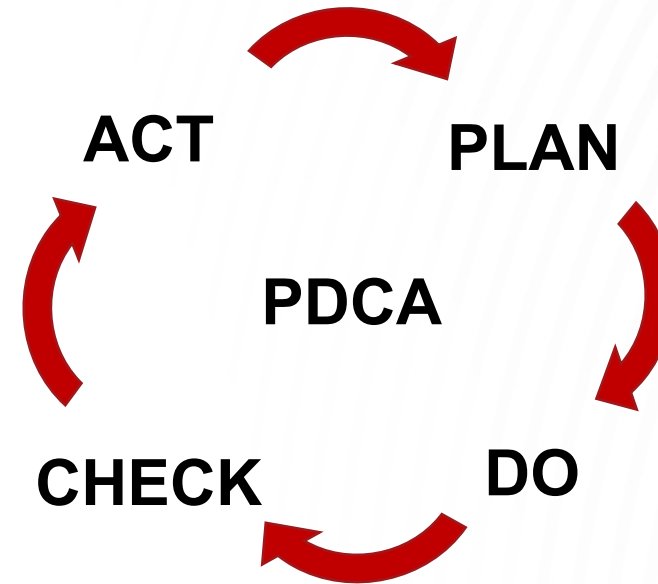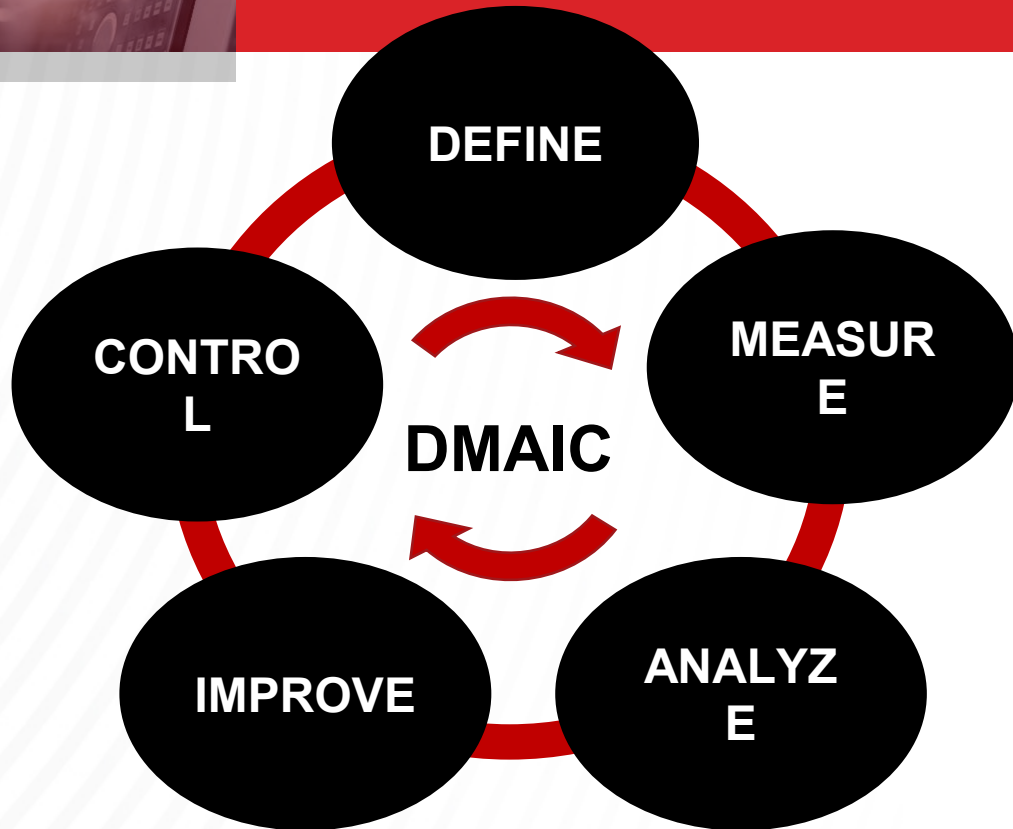
CONTINUOUS IMPROVEMENT

- ☐ **Digital manufacturing puts the "continuous" back into continuous improvement**

- ☐ **Technology is certainly the focus of many Industry 4.0 conversations.   However, technology is the enabler, not the end goal**

- ☐ **Industry 4.0 continues to be built on the foundations of continuous improvement.**

- ☐ **Digital technologies allow manufacturers to step through continuous improvement cycles *faster***

DIGITAL TECHNOLOGIES ENABLE CONTINUOUS IMPROVEMENT USE CASES THAT WERE NOT POSSIBLE PRE-DIGITAL

DIGITAL ENABLER ENCODER

DMAIC
- DEFINE
- MEASURE
- ANALYZE
- IMPROVE
- CONTROL
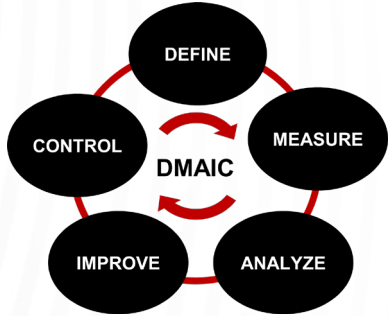
Example Industry 4.0 Technologies

I need to gather information about my process
☐ **Sensors, Big Data**

I need to communicate information
☐ **IOT, Communication Protocols**

I need to learn from the information
☐ **Analytics, AI, Machine Learning**

I want to try improvements without interrupting operations
☐ **Digital Twin, Virtual Commissioning**

I need to drive what I learned back into my process
☐ **Control Systems, AR/VR, Systems Integration**
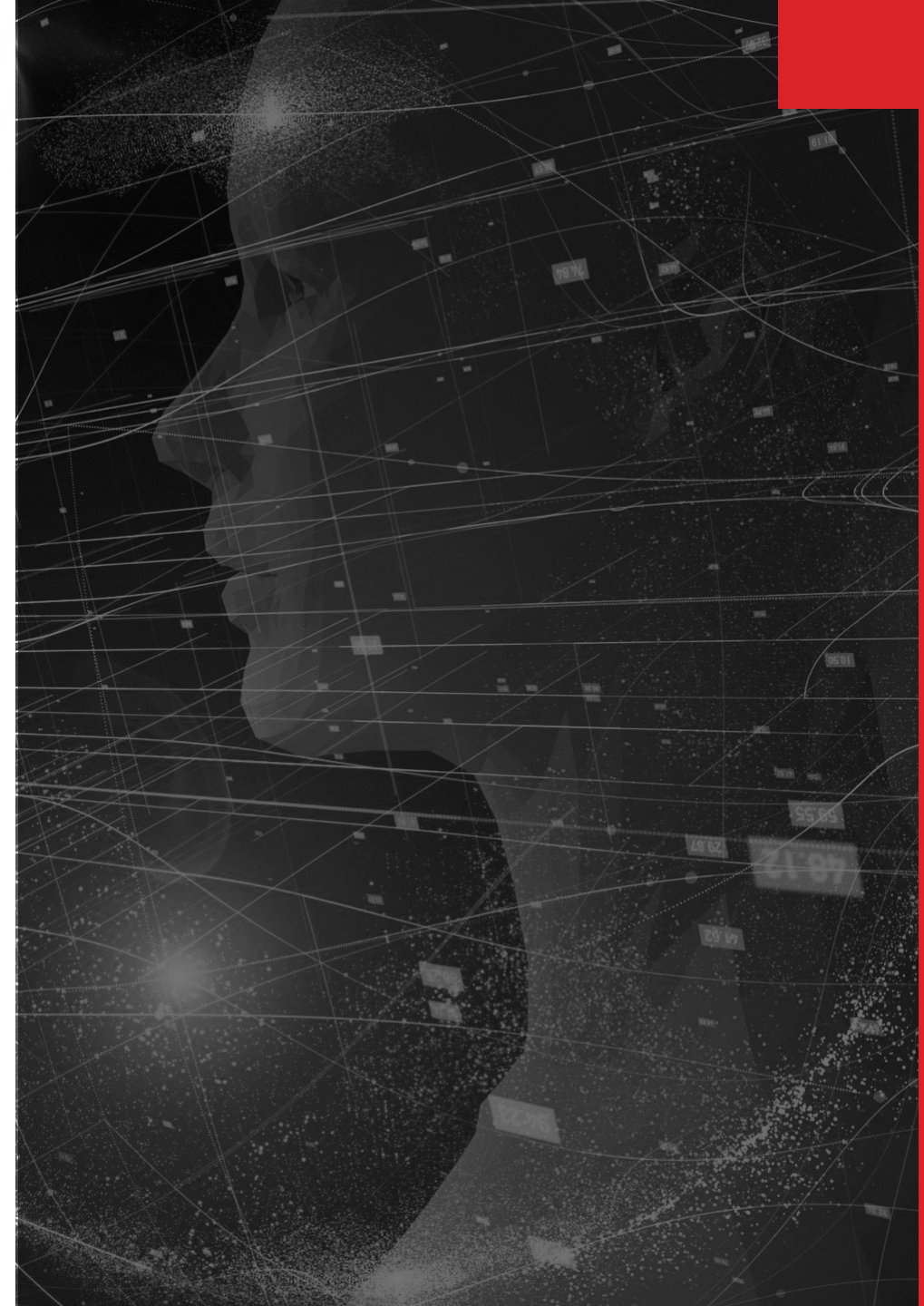
EXAMPLES

□ **Using real-time metrology data to continuously update CNC programming to produce high accuracy machining over varying temperatures**
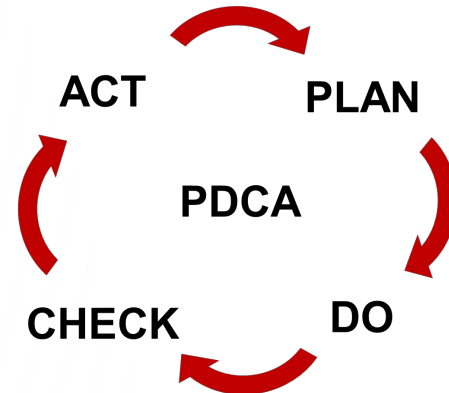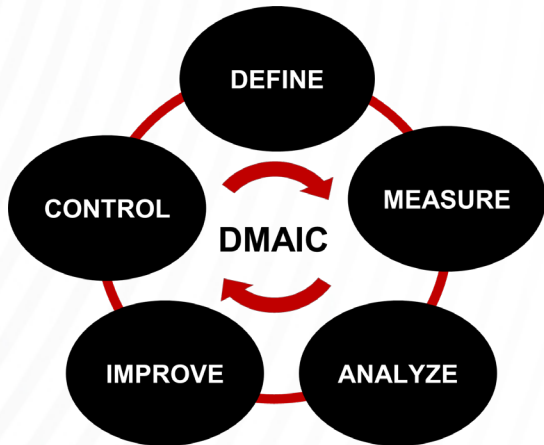
□ **Using machine learning to analyze environmental variables and predict when a recirculating rinse tank will be low on water**
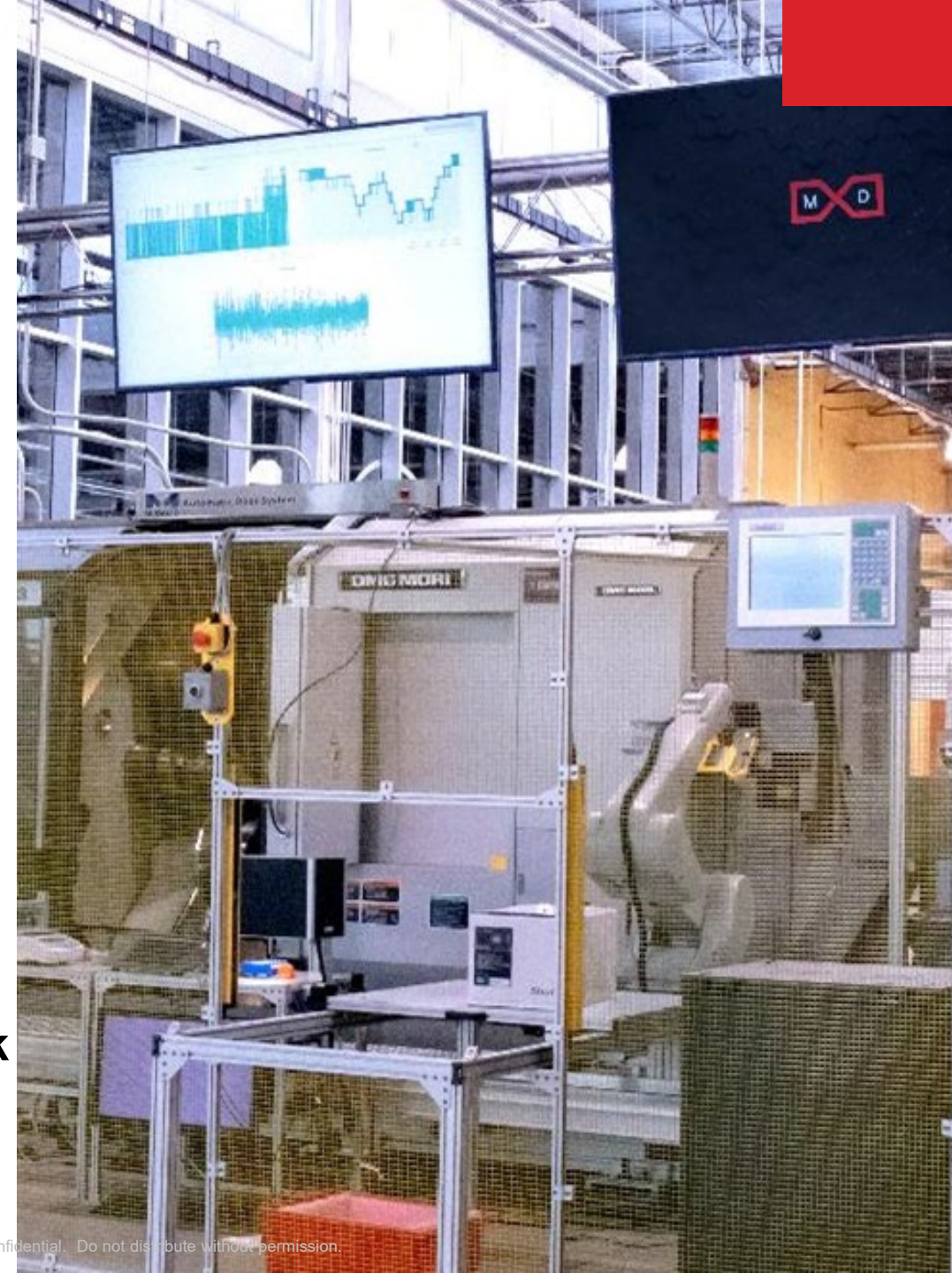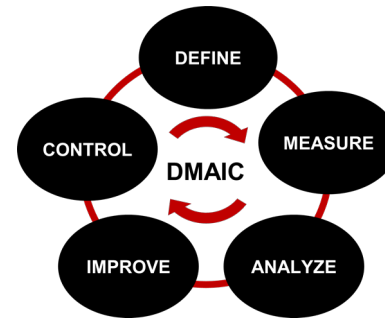
The Digital Thread

Continuous improvement is generally thought of in terms of functional silos
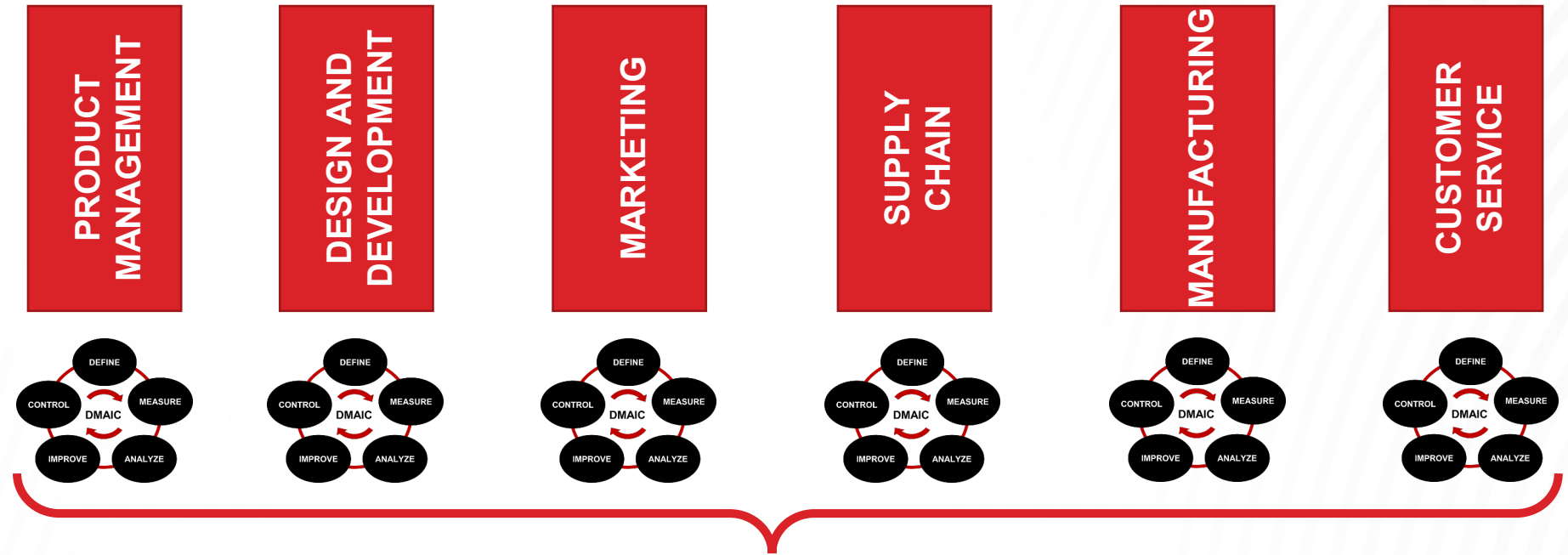
Digital technology promotes the speed, communication and flexibility needed…

… for continuous improvement to move seamlessly across functions

MISCONCEPTIONS

❌ **Industry 4.0 forms a new foundation for manufacturing**

➤ **Industry 4.0 does not fundamentally change the goals or continuous improvement methodology of manufacturing.   It does introduce new technologies which enhance data acquisition and analytics speed to bring continuous improvement to much higher level of capability**

❌ **Digital technology will fix a bad factory process**

➤ **Introducing digital technology to a poorly managed factory or a bad manufacturing process will just result in building bad product faster!**

The "Tony D" Definition of Industry 4.0

The convergence of digital technologies and protocols which enable high-speed automation of the continuous improvement process across the enterprise
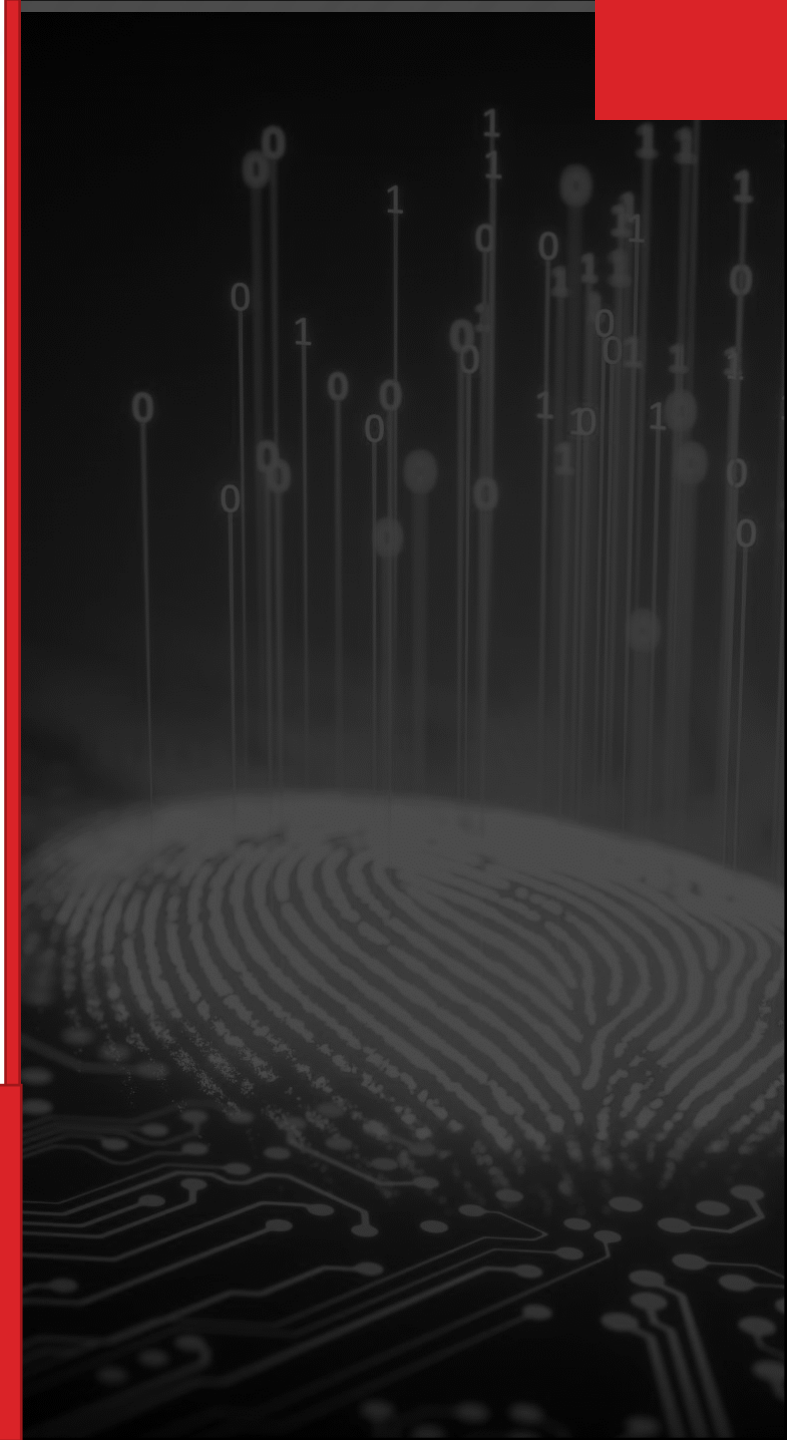
DO'S AND DON'TS

DO:

Make sure you understand your process and have implemented Lean, Six Sigma, or similar continuous improvement techniques

☐ **Map / flow chart your process**

☐ **Understand and Pareto problems**

☐ **Don't obtain technology in search of a problem**

WHAT PROBLEM ARE YOU TRYING TO FIX?

DON'T:

Take an all or nothing approach

- ☐ **Take a measured approach**

- ☐ **Start with subsystem implementation to learn**

- ☐ **Target specific problems with a measurable impact**

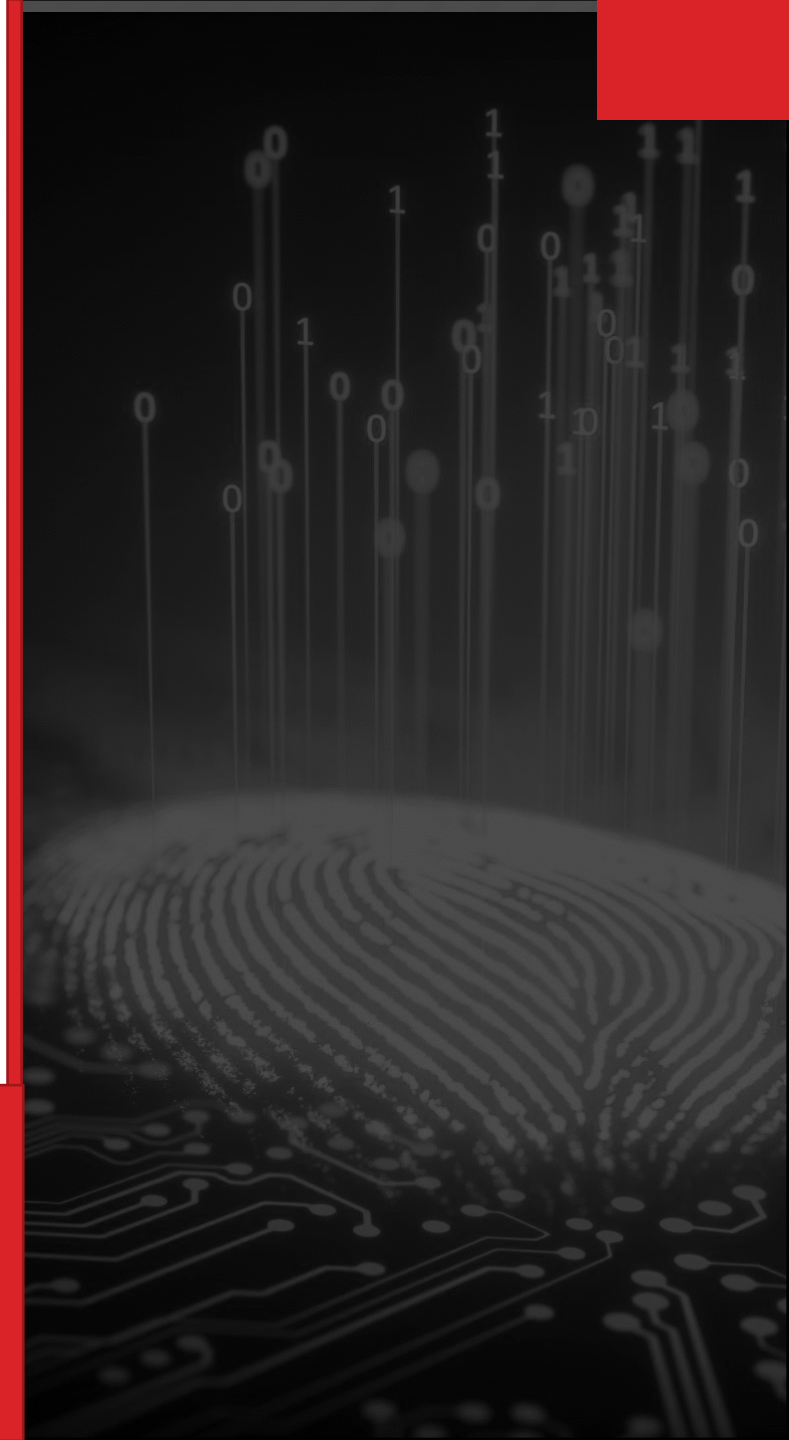# ROI MUST BE CONSISTENT WITH BUSINESS CADENCE
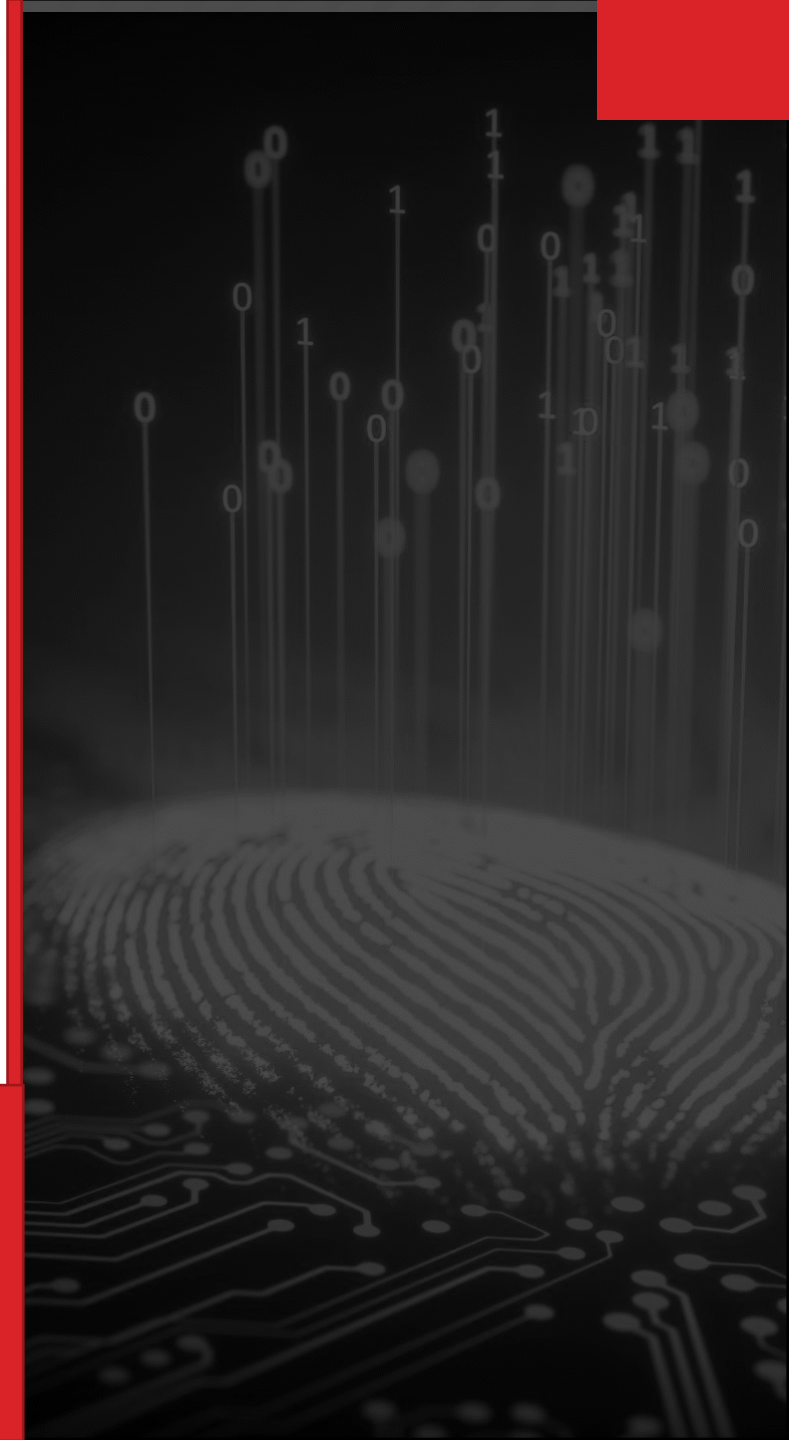
DO:

Plan for scalability

- ☐ **While subsystems are a good way to start the digital journey, there is a danger of creating disparate systems**

- ☐ **Don't get locked into one particular, proprietary platform**

- ☐ **Use standardized protocols across enterprise solutions**

# SYSTEMS INTEGRATION IS THE ULTIMATE POWER OF INDUSTRY 4.0

DON'T:

Ignore Cybersecurity

- Rapid adoption of digital technologies throughout manufacturing is increasing security risk

- Many small and medium-sized companies are not adequately protected

- Small and medium-sized companies are the attack vector of choice to get to larger enterprises

LACK OF OT CYBERSECURITY CAN BRING DOWN A FACTORY
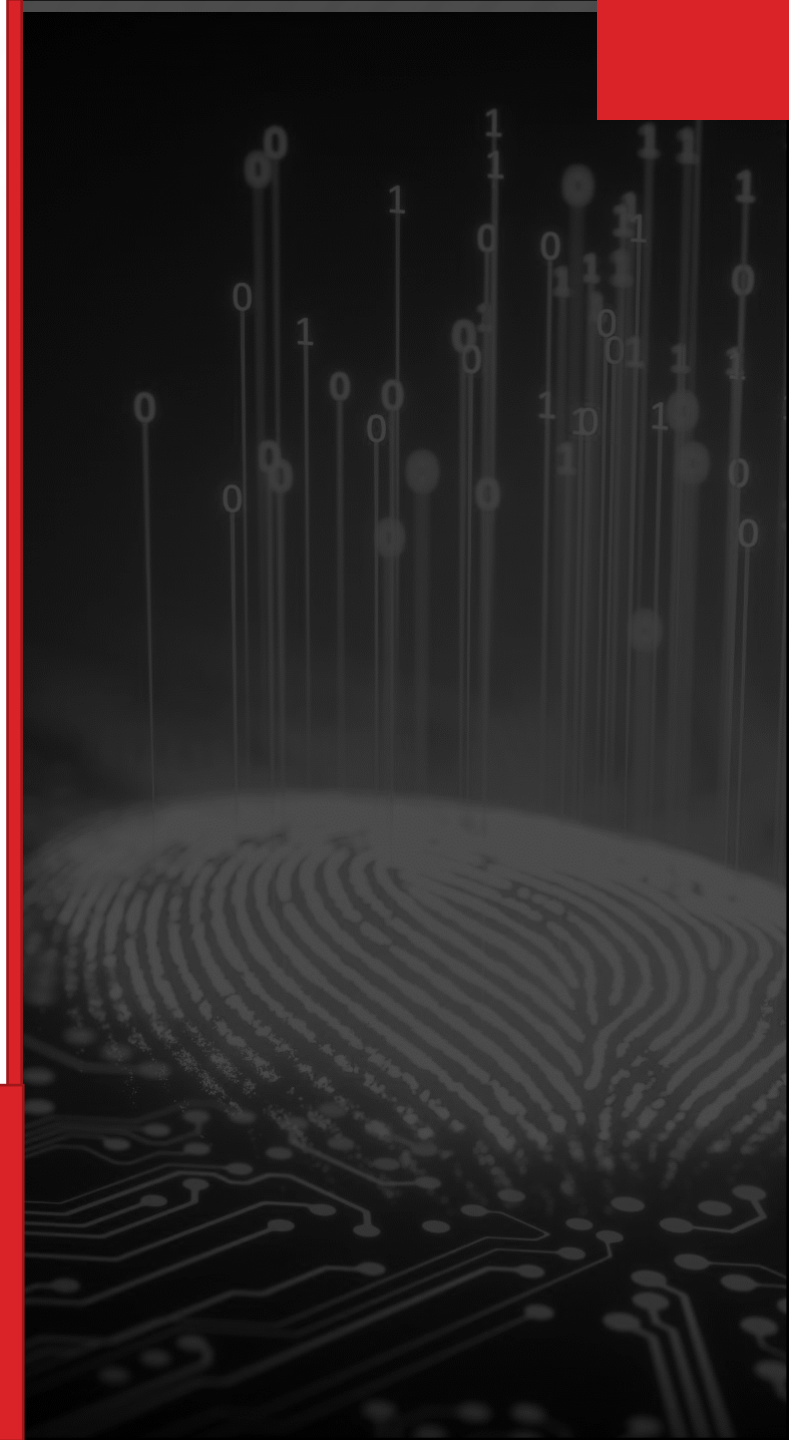
35% OF ALL CYBER-ESPIONAGE ATTACKS IN THE U.S. ARE TARGETED AT THE MANUFACTURING SECTOR

Cybersecurity Checklist

Boost your cyber defenses with these must-have security measures:

1

STAFF AWARENESS TRAINING

Human error is the leading cause of data breaches, so you need to equip staff with the knowledge to deal with the threats they face. Training courses will show staff how security threats affect them and help them apply best-practice advice to real-world situations.

2

APPLICATION SECURITY

Web application vulnerabilities are a common point of intrusion for cyber criminals. As applications play an increasingly critical role in business, it is vital to focus on web application security.

3

NETWORK SECURITY

Network security is the process of protecting the usability and integrity of your network and data. This is achieved by conducting a network penetration test, which scans your network for vulnerabilities and security issues.

Cybersecurity Checklist

Boost your cyber defenses with these must-have security measures:

4

LEADERSHIP COMMITMENT

Leadership commitment is the key to cyber resilience. Without it, it is very difficult to establish or enforce effective processes. Top management must be prepared to invest in appropriate cybersecurity resources, such as awareness training.

5

PASSWORD MANAGEMENT

You should implement a password management policy provides guidance to ensure staff create strong passwords and keep them secure.
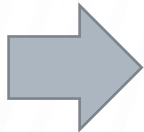
WHY?

WHY YOU SHOULD CONSIDER DIGITAL

The Product Development Analogy

Product Development

Manufacturing

Over the last 35 years….

Over the next 20 years….

Simulation

Digital Twin

Expensive
Limited Capability

➡ Readily Available
Simulate Almost Anything

Can Be Expensive
Difficult to Implement
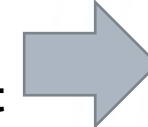
➡ Standard Practice in Factories
Real Time Everything

90% Reduction in Product Development Time

Amount of Efficiency Gains in the Manufacturing?

COMPANIES THAT DID NOT GO DIGITAL DID NOT SURVIVE

DISCUSSION

HOW CRITICAL DO YOU THINK DIGITAL WILL BE TO COMPETITIVENESS IN THE FUTURE?

WHERE ARE YOU IN YOUR DIGITAL JOURNEY?

DID TODAY'S METHODOLGY DISCUSSION MAKE YOU THINK OF DIGITAL MANUFACTURING DIFFERENTLY?

Tony Del Sesto
Technical Fellow, MxD

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@MxDInnovates

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SHORT BREAK

We will start again in 15 minutes.

Mike Yucuis
**Government Engagement Manager
Director, MxD**

Paula Trimble
**Policy Chief and Director of Small Business
Programs , SDA**

Dr. Ruby Crenshaw-Lawrence
**Associate Director for Congressional and
Legislative Small Business Policy**

*Panel Discussion: DoD Contracting
Considerations*

Katie Bilek

Co-Founder
Govmates

Matchmaking

THANK YOU

Good luck with your matchmaking appointments.

We will be hosting additional matchmaking and supplier scouting events in the future.